

SPSP Empirical Methodology Pre-Conference Workshop

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Poster Title:

Examining the role of concepts in neuroimaging experiments: a mixed-methods approach

Poster Abstract:

The proposed poster provides an outline of a mixed-method approach for researching the use of the concepts of mental imagery and hallucinations in neuroimaging experiments.¹ These two concepts have a long-established (albeit disputed) role in distinguishing between ordinary and pathological forms of *sensory-like mental phenomena*.² However, during neuroimaging experiments on ordinary mental imagery, neurological activity is frequently measured that shares remarkable similarities with those measurements reported in neuroimaging experiments on pathological hallucinations. Although the overlapping results are not surprising in and of themselves, they point towards a puzzle. This puzzle centres on the question of why these (inadvertently shared) measurements are reported as evidence for a unique mechanism for whichever conceptualisation of sensory-like mental phenomena is being investigated.³ Put another way, this question suggests that similar experimental measurements contribute to diverging findings depending on the concept being used in the experiment. To investigate this possibility, my research involves analysing the ways that the concepts of mental imagery and hallucinations are each used, in conjunction with comparable neuroimaging techniques, to generate knowledge about the neurological mechanisms of sensory-like mental phenomena. To this end, a relevant sample of published neuroimaging research articles were collected following the PRISMA recommendations for systematic reviews.⁴ Secondly, drawing on textual analysis methods, these articles were sorted into sub-sets of articles. Each subset provides a paradigmatic example of articles where experiences of sensory-like mental phenomena, conceptualised as either mental imagery or hallucinations, were reported as correlating to the same regionally specific change in neurological activity. Finally, a close qualitative analysis of these examples provides an avenue for exploring how the use of each concept relates to the knowledges generated in experimental neuroimaging practices. In presenting this poster, I aim to provide a space to discuss both the challenges and benefits of drawing on multiple research methods.

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¹ As discussed in my conference presentation, I am treating concepts as tools that are used in ways that extend beyond their role as representations or exemplars. For related approaches to conceptual practice, see examples in: Uljana Feest and Friedrich Steinle, eds., *Scientific Concepts and Investigative Practice*, Berlin Studies in Knowledge Research, volume 3 (Berlin: De Gruyter, 2012).

² Note that the term *sensory-like mental phenomena* is used in a similar way, although for all sensory modalities and with less clinical connotations, to the use of 'phantom perceptions' for both imagery and hallucinations in Joel Pearson and Fred Westbrook, 'Phantom Perception: Voluntary and Involuntary Nonretinal Vision', *Trends in Cognitive Sciences* 19, no. 5 (2015): 278–84, doi:10.1016/j.tics.2015.03.004.

³ Within this context, 'neurological mechanisms' include any entities or activities that are sought to explain how the phenomena (mental imagery or hallucination) come about. This use is consistent with the way that 'mechanisms' are treated in neuroscience research, see (Machamer, Darden, and Craver 2000, 2–3).

⁴ For more on PRISMA (the Preferred Reporting Items for Systematic reviews and Meta-Analyses), see, David Moher et al., 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement', *BMJ* 339 (21 July 2009): 4, doi:10.1136/bmj.b2535.